

# Sequence Listing

<110> Henry B. Lowman, Leonard G. Presta, Paula M. Jardieu, John Lowe

5 <120> Anti-IgE Antibodies and Method of Improving Polypeptides

<130> P1123R1

<140> US 09/109,207

10 <141> 1998-06-30

<150> US 60/051,554

<151> 1997-07-03

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25 <223> Expression plasmid

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 <213> Mus musculus

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 20 25 30  
 Ser Gly Tyr Ser Trp Asn Trp Ile Arg Gln Phe Pro Gly Asn Lys  
 35 40 45  
 40 Leu Glu Trp Met Gly Ser Ile Thr Tyr Asp Gly Ser Ser Asn Tyr  
 50 55 60  
 Asn Pro Ser Leu Lys Asn Arg Ile Ser Val Thr Arg Asp Thr Ser  
 45 65 70 75  
 Gln Asn Gln Phe Phe Leu Lys Leu Asn Ser Ala Thr Ala Glu Asp  
 80 85 90  
 50 Thr Ala Thr Tyr Tyr Cys Ala Arg Gly Ser His Tyr Phe Gly His  
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 55 Ser

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 <213> Artificial

<220>  
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 <222> 1-121  
 5 <223> F(ab) sequence derived from MAE11

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 10 Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Tyr Ser Ile Thr  
 20 25 30  
 15 Ser Gly Tyr Ser Trp Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly  
 35 40 45  
 Leu Glu Trp Val Ala Ser Ile Thr Tyr Asp Gly Ser Thr Asn Tyr  
 50 55 60  
 20 Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser  
 65 70 75  
 25 Lys Asn Thr Phe Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp  
 80 85 90  
 Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ser His Tyr Phe Gly His  
 95 100 105  
 30 Trp His Phe Ala Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser  
 110 115 120  
 Ser

35 <210> 4  
 <211> 121  
 <212> PRT  
 <213> Homo sapiens

40 <220>  
 <221> unsure  
 <222> 30, 104-108  
 <223> unknown amino acid

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 1 5 10 15  
 50 Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Xaa  
 20 25 30  
 Ser Asp Tyr Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly  
 35 40 45  
 55 Leu Glu Trp Val Ala Val Ile Ser Asn Gly Ser Asp Thr Tyr Tyr  
 50 55 60  
 Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser  
 65 70 75  
 60 Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp  
 80 85 90

Thr Ala Val Tyr Tyr Cys Ala Arg Asp Ser Arg Phe Phe Xaa Xaa  
                             95                            100                            105

5 Xaa Xaa Xaa Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser  
                             110                            115                            120

Ser

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     <212> PRT  
     <213> Mus musculus

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20 Gly Gln Arg Ala Thr Ile Ser Cys Lys Ala Ser Gln Ser Val Asp  
                             20                            25                            30

Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly  
                             35                            40                            45

25 Gln Pro Pro Ile Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Gly Ser  
                             50                            55                            60

30 Glu Ile Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe  
                             65                            70                            75

Thr Leu Asn Ile His Pro Val Glu Glu Glu Asp Ala Ala Thr Phe  
                             80                            85                            90

35 Tyr Cys Gln Gln Ser His Glu Asp Pro Tyr Thr Phe Gly Ala Gly  
                             95                            100                            105

Thr Lys Leu Glu Ile Lys  
                             110

40 <210> 6  
     <211> 111  
     <212> PRT  
     <213> Artificial

45 <220>  
     <221> Artificial  
     <222> 1-111  
     <223> F(ab) light chain sequence derived from MAE11

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55 Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Val Asp  
                             20                            25                            30

Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly  
                             35                            40                            45

60 Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Glu Ser  
                             50                            55                            60

Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe  
                                 65                                70                                75  
 5 Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr  
                                 80                                85                                90  
 Tyr Cys Gln Gln Ser His Glu Asp Pro Tyr Thr Phe Gly Gln Gly  
                                 95                                100                                105  
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                                 110  
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 15 <211> 111  
     <212> PRT  
     <213> Homo sapiens  
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     <223> unknown amino acid  
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                                 20                                25                                30  
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                                 35                                40                                45  
 Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Ser Leu Glu Ser  
 35                                50                                55                                60  
 Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe  
                                 65                                70                                75  
 40 Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr  
                                 80                                85                                90  
 Tyr Cys Gln Gln Tyr Asn Ser Leu Pro Tyr Thr Phe Gly Gln Gly  
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Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Lys Pro Val Asp  
 20 25 30

5 Gly Glu Gly Asp Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly  
 35 40 45

Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Glu Ser  
 50 55 60

10 Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe  
 65 70 75

Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr  
 80 85 90

15 Tyr Cys Gln Gln Ser His Glu Asp Pro Tyr Thr Phe Gly Gln Gly  
 95 100 105

20 Thr Lys Val Glu Ile Lys Arg Thr Val  
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 <211> 114  
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35 Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Val Asp  
 20 25 30

Tyr Glu Gly Asp Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly  
 35 40 45

Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Glu Ser  
 50 55 60

45 Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe  
 65 70 75

Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr  
 80 85 90

50 Tyr Cys Gln Gln Ser His Glu Asp Pro Tyr Thr Phe Gly Gln Gly  
 95 100 105

55 Thr Lys Val Glu Ile Lys Arg Thr Val  
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<210> 10  
 <211> 114  
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 <222> 1-114  
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 1 5 10 15  
 Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Val Asp  
 10 20 25 30  
 Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly  
 35 40 45  
 15 Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Glu Ser  
 50 55 60  
 Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe  
 65 70 75  
 20 Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr  
 80 85 90  
 Tyr Cys Gln Gln Ser His Glu Asp Pro Tyr Thr Phe Gly Gln Gly  
 25 95 100 105  
 Thr Lys Val Glu Ile Lys Arg Thr Val  
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 <211> 114  
 <212> PRT  
 <213> Artificial

35 <220>  
 <221> Artificial  
 <222> 1-114  
 <223> Heavy chain sequence derived from MAE11

40 <400> 11  
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 1 5 10 15  
 Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Tyr Ser Ile Thr  
 45 20 25 30  
 Ser Gly Tyr Ser Trp Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly  
 35 40 45  
 50 Leu Glu Trp Val Ala Ser Ile Lys Tyr Ser Gly Glu Thr Lys Tyr  
 50 55 60  
 Asn Pro Ser Val Lys Gly Arg Ile Thr Ile Ser Arg Asp Asp Ser  
 65 70 75  
 55 Lys Asn Thr Phe Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp  
 80 85 90  
 Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ser His Tyr Phe Gly His  
 60 95 100 105  
 Trp His Phe Ala Val Trp Gly Gln Gly

<210> 12  
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 <213> Artificial  
  
 <220>  
 <221> Artificial  
 10 <222> 1-114  
 <223> Heavy chain sequence derived from MAE11  
  
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      Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Tyr Ser Ile Thr  
                   20                   25                   30  
 20   Ser Gly Tyr Ser Trp Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly  
                   35                   40                   45  
      Leu Glu Trp Val Ala Ser Ile Thr Tyr Asp Gly Ser Thr Asn Tyr  
                   50                   55                   60  
 25   Asn Pro Ser Val Lys Gly Arg Ile Thr Ile Ser Arg Asp Asp Ser  
                   65                   70                   75  
      Lys Asn Thr Phe Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp  
 30                   80                   85                   90  
      Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ser His Tyr Phe Gly His  
                   95                   100                   105  
 35   Trp His Phe Ala Val Trp Gly Gln Gly  
                   110

<210> 13  
 <211> 218  
 40 <212> PRT  
 <213> Artificial  
  
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 45 <222> 1-218  
 <223> Light chain sequence derived from MAE11  
  
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      Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Val Asp  
                   20                   25                   30  
 55   Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly  
                   35                   40                   45  
      Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Glu Ser  
                   50                   55                   60  
 60   Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe  
                   65                   70                   75

	Thr	Leu	Thr	Ile	Ser	Ser	Leu	Gln	Pro	Glu	Asp	Phe	Ala	Thr	Tyr	80	85	90	
5	Tyr	Cys	Gln	Gln	Ser	His	Glu	Asp	Pro	Tyr	Thr	Phe	Gly	Gln	Gly	95	100	105	
	Thr	Lys	Val	Glu	Ile	Lys	Arg	Thr	Val	Ala	Ala	Pro	Ser	Val	Phe	110	115	120	
10	Ile	Phe	Pro	Pro	Ser	Asp	Glu	Gln	Leu	Lys	Ser	Gly	Thr	Ala	Ser	125	130	135	
15	Val	Val	Cys	Leu	Leu	Asn	Asn	Phe	Tyr	Pro	Arg	Glu	Ala	Lys	Val	140	145	150	
	Gln	Trp	Lys	Val	Asp	Asn	Ala	Leu	Gln	Ser	Gly	Asn	Ser	Gln	Glu	155	160	165	
20	Ser	Val	Thr	Glu	Gln	Asp	Ser	Lys	Asp	Ser	Thr	Tyr	Ser	Leu	Ser	170	175	180	
	Ser	Thr	Leu	Thr	Leu	Ser	Lys	Ala	Asp	Tyr	Glu	Lys	His	Lys	Val	185	190	195	
25	Tyr	Ala	Cys	Glu	Val	Thr	His	Gln	Gly	Leu	Ser	Ser	Pro	Val	Thr	200	205	210	
30	Lys	Ser	Phe	Asn	Arg	Gly	Glu	Cys								215			
35	<210> 14																		
	<211> 451																		
	<212> PRT																		
	<213> Artificial																		
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	<222> 1-451																		
40	<223> Heavy chain sequence derived from MAE11																		
	<400> 14																		
45	Glu	Val	Gln	Leu	Val	Glu	Ser	Gly	Gly	Gly	Leu	Val	Gln	Pro	Gly	1	5	10	15
	Gly	Ser	Leu	Arg	Leu	Ser	Cys	Ala	Val	Ser	Gly	Tyr	Ser	Ile	Thr	20	25	30	
50	Ser	Gly	Tyr	Ser	Trp	Asn	Trp	Ile	Arg	Gln	Ala	Pro	Gly	Lys	Gly	35	40	45	
	Leu	Glu	Trp	Val	Ala	Ser	Ile	Thr	Tyr	Asp	Gly	Ser	Thr	Asn	Tyr	50	55	60	
55	Asn	Pro	Ser	Val	Lys	Gly	Arg	Ile	Thr	Ile	Ser	Arg	Asp	Asp	Ser	65	70	75	
	Lys	Asn	Thr	Phe	Tyr	Leu	Gln	Met	Asn	Ser	Leu	Arg	Ala	Glu	Asp	80	85	90	
60	Thr	Ala	Val	Tyr	Tyr	Cys	Ala	Arg	Gly	Ser	His	Tyr	Phe	Gly	His	95	100	105	

	Trp His Phe Ala Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser	110	115	120
5	Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser	125	130	135
	Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val	140	145	150
10	Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly	155	160	165
	Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser	170	175	180
15	Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser	185	190	195
20	Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro	200	205	210
	Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp	215	220	225
25	Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly	230	235	240
	Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu	245	250	255
30	Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val	260	265	270
	Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly	275	280	285
	Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr	290	295	300
40	Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln	305	310	315
	Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys	320	325	330
45	Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly	335	340	345
	Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu	350	355	360
	Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly	365	370	375
55	Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln	380	385	390
	Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp	395	400	405
60	Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg			

	410	415	420
	Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala		
	425	430	435
5	Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly		
	440	445	450
10	Lys		
	<210> 15		
	<211> 218		
	<212> PRT		
15	<213> Artificial		
	<220>		
	<221> Artificial		
	<222> 1-218		
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	<400> 15		
	Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val		
	1 5 10 15		
25	Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Lys Pro Val Asp		
	20 25 30		
	Gly Glu Gly Asp Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly		
30	35 40 45		
	Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Glu Ser		
	50 55 60		
35	Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe		
	65 70 75		
	Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr		
40	80 85 90		
	Tyr Cys Gln Gln Ser His Glu Asp Pro Tyr Thr Phe Gly Gln Gly		
	95 100 105		
	Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe		
45	110 115 120		
	Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser		
	125 130 135		
50	Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val		
	140 145 150		
	Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu		
55	155 160 165		
	Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser		
	170 175 180		
	Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val		
60	185 190 195		
	Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr		

	200	205	210
	Lys Ser Phe Asn Arg Gly Glu Cys		
	215		
5	<210> 16		
	<211> 451		
	<212> PRT		
	<213> Artificial		
10	<220>		
	<221> Artificial		
	<222> 1-451		
	<223> Heavy chain sequence derived from MAE11		
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	Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly		
	1 5 10 15		
20	Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Tyr Ser Ile Thr		
	20 25 30		
	Ser Gly Tyr Ser Trp Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly		
	35 40 45		
25	Leu Glu Trp Val Ala Ser Ile Thr Tyr Asp Gly Ser Thr Asn Tyr		
	50 55 60		
	Asn Pro Ser Val Lys Gly Arg Ile Thr Ile Ser Arg Asp Asp Ser		
30	65 70 75		
	Lys Asn Thr Phe Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp		
	80 85 90		
35	Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ser His Tyr Phe Gly His		
	95 100 105		
	Trp His Phe Ala Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser		
	110 115 120		
40	Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser		
	125 130 135		
	Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val		
45	140 145 150		
	Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly		
	155 160 165		
50	Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser		
	170 175 180		
	Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser		
	185 190 195		
55	Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro		
	200 205 210		
	Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp		
60	215 220 225		
	Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly		

	230	235	240
	Gly Pro Ser Val Phe Leu Phe Pro Pro	Lys Pro Lys Asp Thr Leu	
	245	250	255
5	Met Ile Ser Arg Thr Pro Glu Val Thr	Cys Val Val Val Asp Val	
	260	265	270
	Ser His Glu Asp Pro Glu Val Lys Phe	Asn Trp Tyr Val Asp Gly	
10	275	280	285
	Val Glu Val His Asn Ala Lys Thr Lys	Pro Arg Glu Glu Gln Tyr	
	290	295	300
15	Asn Ser Thr Tyr Arg Val Val Ser Val	Leu Thr Val Leu His Gln	
	305	310	315
	Asp Trp Leu Asn Gly Lys Glu Tyr Lys	Cys Lys Val Ser Asn Lys	
20	320	325	330
	Ala Leu Pro Ala Pro Ile Glu Lys Thr	Ile Ser Lys Ala Lys Gly	
	335	340	345
	Gln Pro Arg Glu Pro Gln Val Tyr Thr	Leu Pro Pro Ser Arg Glu	
25	350	355	360
	Glu Met Thr Lys Asn Gln Val Ser Leu	Thr Cys Leu Val Lys Gly	
	365	370	375
30	Phe Tyr Pro Ser Asp Ile Ala Val Glu	Trp Glu Ser Asn Gly Gln	
	380	385	390
	Pro Glu Asn Asn Tyr Lys Thr Thr Pro	Pro Val Leu Asp Ser Asp	
	395	400	405
35	Gly Ser Phe Phe Leu Tyr Ser Lys Leu	Thr Val Asp Lys Ser Arg	
	410	415	420
	Trp Gln Gln Gly Asn Val Phe Ser Cys	Ser Val Met His Glu Ala	
40	425	430	435
	Leu His Asn His Tyr Thr Gln Lys Ser	Leu Ser Leu Ser Pro Gly	
	440	445	450
45	Lys		
	<210> 17		
	<211> 218		
50	<212> PRT		
	<213> Artificial		
	<220>		
	<221> Artificial		
55	<222> 1-218		
	<223> Light chain sequence derived from MAE11		
	<400> 17		
60	Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val		
	1 5 10 15		
	Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Lys Pro Val Asp		



	20	25	30
	Gly Glu Gly Asp Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly		
	35	40	45
5	Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Glu Ser		
	50	55	60
10	Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe		
	65	70	75
	Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr		
	80	85	90
15	Tyr Cys Gln Gln Ser His Glu Asp Pro Tyr Thr Phe Gly Gln Gly		
	95	100	105
	Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe		
	110	115	120
20	Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser		
	125	130	135
25	Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val		
	140	145	150
	Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu		
	155	160	165
30	Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser		
	170	175	180
	Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val		
	185	190	195
35	Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr		
	200	205	210
40	Lys Ser Phe Asn Arg Gly Glu Cys		
	215		
	<210> 18		
	<211> 451		
	<212> PRT		
45	<213> Artificial		
	<220>		
	<221> Artificial		
	<222> 1-451		
50	<223> Heavy chain sequence derived from MAE11		
	<400> 18		
	Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly		
	1	5	10
55	Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Tyr Ser Ile Thr		
	20	25	30
60	Ser Gly Tyr Ser Trp Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly		
	35	40	45
	Leu Glu Trp Val Ala Ser Ile Lys Tyr Ser Gly Glu Thr Lys Tyr		

	50	55	60
	Asn Pro Ser Val Lys Gly Arg Ile Thr	Ile Ser Arg Asp Asp Ser	
	65	70	75
5	Lys Asn Thr Phe Tyr Leu Gln Met Asn	Ser Leu Arg Ala Glu Asp	
	80	85	90
	Thr Ala Val Tyr Tyr Cys Ala Arg Gly	Ser His Tyr Phe Gly His	
10	95	100	105
	Trp His Phe Ala Val Trp Gly Gln Gly	Thr Leu Val Thr Val Ser	
	110	115	120
15	Ser Ala Ser Thr Lys Gly Pro Ser Val	Phe Pro Leu Ala Pro Ser	
	125	130	135
	Ser Lys Ser Thr Ser Gly Gly Thr Ala	Ala Leu Gly Cys Leu Val	
20	140	145	150
	Lys Asp Tyr Phe Pro Glu Pro Val Thr	Val Ser Trp Asn Ser Gly	
	155	160	165
	Ala Leu Thr Ser Gly Val His Thr Phe	Pro Ala Val Leu Gln Ser	
25	170	175	180
	Ser Gly Leu Tyr Ser Leu Ser Ser Val	Val Thr Val Pro Ser Ser	
	185	190	195
30	Ser Leu Gly Thr Gln Thr Tyr Ile Cys	Asn Val Asn His Lys Pro	
	200	205	210
	Ser Asn Thr Lys Val Asp Lys Lys Val	Glu Pro Lys Ser Cys Asp	
35	215	220	225
	Lys Thr His Thr Cys Pro Pro Cys Pro	Ala Pro Glu Leu Leu Gly	
	230	235	240
	Gly Pro Ser Val Phe Leu Phe Pro Pro	Lys Pro Lys Asp Thr Leu	
40	245	250	255
	Met Ile Ser Arg Thr Pro Glu Val Thr	Cys Val Val Val Asp Val	
	260	265	270
45	Ser His Glu Asp Pro Glu Val Lys Phe	Asn Trp Tyr Val Asp Gly	
	275	280	285
	Val Glu Val His Asn Ala Lys Thr Lys	Pro Arg Glu Glu Gln Tyr	
50	290	295	300
	Asn Ser Thr Tyr Arg Val Val Ser Val	Leu Thr Val Leu His Gln	
	305	310	315
	Asp Trp Leu Asn Gly Lys Glu Tyr Lys	Cys Lys Val Ser Asn Lys	
55	320	325	330
	Ala Leu Pro Ala Pro Ile Glu Lys Thr	Ile Ser Lys Ala Lys Gly	
	335	340	345
60	Gln Pro Arg Glu Pro Gln Val Tyr Thr	Leu Pro Pro Ser Arg Glu	
	350	355	360

	Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly	365	370	375
5	Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln	380	385	390
	Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp	395	400	405
10	Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg	410	415	420
	Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala	425	430	435
15	Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly	440	445	450
20	Lys			
	<210> 19			
	<211> 218			
	<212> PRT			
25	<213> Artificial			
	<220>			
	<221> Artificial			
	<222> 1-218			
30	<223> Light chain F(ab) sequence derived from MAE11			
	<400> 19			
	Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val	1	5	10 15
35	Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Lys Pro Val Asp	20	25	30
40	Gly Glu Gly Asp Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly	35	40	45
	Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Glu Ser	50	55	60
45	Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe	65	70	75
	Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr	80	85	90
50	Tyr Cys Gln Gln Ser His Glu Asp Pro Tyr Thr Phe Gly Gln Gly	95	100	105
	Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe	110	115	120
55	Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser	125	130	135
60	Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val	140	145	150

	Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu	155	160	165
5	Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser	170	175	180
	Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val	185	190	195
10	Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr	200	205	210
	Lys Ser Phe Asn Arg Gly Glu Cys	215		
15	<210> 20			
	<211> 229			
	<212> PRT			
	<213> Artificial			
20	<220>			
	<221> Artificial			
	<222> 1-229			
	<223> Heavy chain F(ab) sequence derived from MAE11			
25	<400> 20			
	Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly	1	5	10 15
30	Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Tyr Ser Ile Thr	20	25	30
	Ser Gly Tyr Ser Trp Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly	35	40	45
35	Leu Glu Trp Val Ala Ser Ile Thr Tyr Asp Gly Ser Thr Asn Tyr	50	55	60
	Asn Pro Ser Val Lys Gly Arg Ile Thr Ile Ser Arg Asp Asp Ser	65	70	75
40	Lys Asn Thr Phe Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp	80	85	90
	Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ser His Tyr Phe Gly His	95	100	105
	Trp His Phe Ala Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser	110	115	120
50	Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser	125	130	135
	Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val	140	145	150
55	Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly	155	160	165
	Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser	170	175	180

	Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser	185	190	195
5	Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro	200	205	210
	Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp	215	220	225
10	Lys Thr His Thr			
	<210> 21			
	<211> 229			
15	<212> PRT			
	<213> Artificial			
	<220>			
	<221> Artificial			
20	<222> 1-229			
	<223> Heavy chain F(ab) derived from MAE11			
	<400> 21			
25	Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly	1	5	10
	Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Tyr Ser Ile Thr	20	25	30
30	Ser Gly Tyr Ser Trp Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly	35	40	45
	Leu Glu Trp Val Ala Ser Ile Lys Tyr Ser Gly Glu Thr Lys Tyr	50	55	60
35	Asn Pro Ser Val Lys Gly Arg Ile Thr Ile Ser Arg Asp Asp Ser	65	70	75
40	Lys Asn Thr Phe Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp	80	85	90
	Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ser His Tyr Phe Gly His	95	100	105
45	Trp His Phe Ala Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser	110	115	120
	Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser	125	130	135
50	Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val	140	145	150
	Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly	155	160	165
55	Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser	170	175	180
60	Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser	185	190	195

Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro  
 200 205 210

5 Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp  
 215 220 225

Lys Thr His Thr

10 <210> 22  
 <211> 248  
 <212> PRT  
 <213> Artificial

15 <220>  
 <221> Artificial  
 <222> 1-248  
 <223> sFv sequence derived from MAE11

20 <400> 22  
 Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly  
 1 5 10 15

25 Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Tyr Ser Ile Thr  
 20 25 30

Ser Gly Tyr Ser Trp Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly  
 35 40 45

30 Leu Glu Trp Val Ala Ser Ile Thr Tyr Asp Gly Ser Thr Asn Tyr  
 50 55 60

Asn Pro Ser Val Lys Gly Arg Ile Thr Ile Ser Arg Asp Asp Ser  
 65 70 75

35 Lys Asn Thr Phe Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp  
 80 85 90

40 Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ser His Tyr Phe Gly His  
 95 100 105

Trp His Phe Ala Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser  
 110 115 120

45 Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly  
 125 130 135

Ser Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser  
 140 145 150

50 Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Lys Pro Val  
 155 160 165

Asp Gly Glu Gly Asp Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro  
 170 175 180

55 Gly Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Glu  
 185 190 195

60 Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp  
 200 205 210

Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr  
 215 220 225  
 Tyr Tyr Cys Gln Gln Ser His Glu Asp Pro Tyr Thr Phe Gly Gln  
 5 230 235 240  
 Gly Thr Lys Val Glu Ile Lys Arg  
 245  
 10 <210> 23  
 <211> 248  
 <212> PRT  
 <213> Artificial  
 15 <220>  
 <221> Artificial  
 <222> 1-248  
 <223> sFv sequence derived from MAE11  
 20 <400> 23  
 Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly  
 1 5 10 15  
 Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Tyr Ser Ile Thr  
 25 20 25 30  
 Ser Gly Tyr Ser Trp Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly  
 35 35 40 45  
 30 Leu Glu Trp Val Ala Ser Ile Lys Tyr Ser Gly Glu Thr Lys Tyr  
 50 55 60  
 Asn Pro Ser Val Lys Gly Arg Ile Thr Ile Ser Arg Asp Asp Ser  
 35 65 70 75  
 Lys Asn Thr Phe Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp  
 80 85 90  
 40 Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ser His Tyr Phe Gly His  
 95 100 105  
 Trp His Phe Ala Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser  
 110 115 120  
 45 Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly  
 125 130 135  
 Ser Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser  
 140 145 150  
 50 Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Lys Pro Val  
 155 160 165  
 Asp Gly Glu Gly Asp Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro  
 55 170 175 180  
 Gly Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Glu  
 185 190 195  
 60 Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp  
 200 205 210

	Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr	215	220	225
5	Tyr Tyr Cys Gln Gln Ser His Glu Asp Pro Tyr Thr Phe Gly Gln	230	235	240
	Gly Thr Lys Val Glu Ile Lys Arg	245		
10	<210> 24			
	<211> 218			
	<212> PRT			
	<213> Artificial			
15	<220>			
	<221> Artificial			
	<222> 1-218			
	<223> Light chain F(ab)'2 sequence derived from MAE11			
20	<400> 24			
	Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val	1	5	10 15
25	Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Lys Pro Val Asp	20	25	30
	Gly Glu Gly Asp Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly	35	40	45
30	Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Tyr Leu Glu Ser	50	55	60
	Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe	65	70	75
35	Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr	80	85	90
40	Tyr Cys Gln Gln Ser His Glu Asp Pro Tyr Thr Phe Gly Gln Gly	95	100	105
	Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe	110	115	120
45	Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser	125	130	135
	Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val	140	145	150
50	Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu	155	160	165
	Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser	170	175	180
55	Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val	185	190	195
60	Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr	200	205	210



Lys Ser Phe Asn Arg Gly Glu Cys  
 215

5 <210> 25  
 <211> 233  
 <212> PRT  
 <213> Artificial

10 <220>  
 <221> Artificial sequence  
 <222> 1-233  
 <223> Heavy chain F(ab)'2 sequence derived from MAE11

15 <400> 25  
 Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly  
 1 5 10 15  
 Gly Ser Leu Arg Leu Ser Cys Ala Val Ser Gly Tyr Ser Ile Thr  
 20 20 25 30  
 Ser Gly Tyr Ser Trp Asn Trp Ile Arg Gln Ala Pro Gly Lys Gly  
 35 40 45  
 Leu Glu Trp Val Ala Ser Ile Thr Tyr Asp Gly Ser Thr Asn Tyr  
 25 50 55 60  
 Asn Pro Ser Val Lys Gly Arg Ile Thr Ile Ser Arg Asp Asp Ser  
 65 70 75  
 30 Lys Asn Thr Phe Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp  
 80 85 90  
 Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ser His Tyr Phe Gly His  
 95 100 105  
 35 Trp His Phe Ala Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser  
 110 115 120  
 Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser  
 40 125 130 135  
 Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val  
 140 145 150  
 45 Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly  
 155 160 165  
 Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser  
 170 175 180  
 50 Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser  
 185 190 195  
 Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro  
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 35 40 45

20

Leu Glu Trp Val Ala Ser Ile Lys Tyr Ser Gly Glu Thr Lys Tyr  
 50 55 60

Asn Pro Ser Val Lys Gly Arg Ile Thr Ile Ser Arg Asp Asp Ser  
 65 70 75

25

Lys Asn Thr Phe Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp  
 80 85 90

30

Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ser His Tyr Phe Gly His  
 95 100 105

Trp His Phe Ala Val Trp Gly Gln Gly Thr Leu Val Thr Val Ser  
 110 115 120

35

Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser  
 125 130 135

Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val  
 140 145 150

40

Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly  
 155 160 165

45

Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser  
 170 175 180

Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser  
 185 190 195

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Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro  
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